

What is claimed is:

1. A form variable mirror element comprising:

a form variable part, including a piezoelectric film, a first electrode film and a second electrode film, which supply voltage to the piezoelectric film and, a reflection mirror film provided in the piezoelectric film; and

a base, which supports the form variable part, wherein the form variable part is provided with an elastic unit which gives an elasticity to the form variable part.

2. The form variable mirror element according to claim 1, wherein the first electrode film is provided on one surface of the piezoelectric film and the second electrode film is provided on the other surface.

3. The form variable mirror element according to claim 1, wherein at least one of the reflection mirror film, the first electrode film, the second electrode film and the base has the elasticity as the elastic unit.

4. The form variable mirror element according to claim 1, wherein an elastic sheet film is separately provided as the elastic unit and the elastic sheet film is provided between the base and the reflection mirror film.

5. The form variable mirror element according to claim 1, wherein an area of the base for supporting the form variable part is smaller than the area of the base.

6. The form variable mirror element according to claim 5, wherein the reflection mirror film provided in the form variable part is extended onto the base and the reflection mirror film provided in the form variable part is formed integrally with the reflection mirror film provided in a part in which the form variable part is not disposed.

7. The form variable mirror element according to claim 1, wherein the outer form of the form variable part is at least one form selected from a circular form, an elliptic form, a rectangular form, a polygonal form and a triangular form.

8. The form variable mirror element according to claim 1, wherein a plurality of form variable parts are provided on one base.

9. The form variable mirror element according to claim 4, wherein the elastic sheet film is made of a resin and

the Youngs' modulus of the resin is located within a range of $1/100$ to $1/10$ as high as the Youngs' modulus of the piezoelectric film.

10. The form variable mirror element according to claim 1, wherein the form variable part has a diaphragm structure formed in an opening part of a hollow part of the thin base.

11. The form variable mirror element according to claim 10, wherein the total of an internal stress of the films forming the form variable part is in a state of compressed and tensile stress and an amount of deformation of the form variable part due to the internal stress is $1/4$ or less as long as the wavelength of light used for a PV value.

12. The form variable mirror element according to claim 11, wherein the elastic sheet film is provided in the form variable part as the elastic unit and the thickness of the elastic sheet film is different depending on areas.

13. The form variable mirror element according to claim 11, wherein the thickness of the piezoelectric film provided in the form variable part is different depending on areas.

14. A form variable mirror unit comprising:

a form variable mirror element according to any one of claims 1 to 13 and

an actuator for moving the form variable mirror element itself, wherein the form variable mirror element is formed integrally with the actuator.

15. A method for producing a form variable mirror element comprising the steps of:

bonding a thin base on which a piezoelectric film and a first electrode film or a second electrode film are formed to a base including a resin and etching the thin base.

16. A method for producing a form variable mirror element comprising:

a diaphragm forming step of etching a thin base to form a diaphragm and

a reflection mirror film forming step of forming a reflection mirror film after the diaphragm forming step.

17. The method for producing a form variable mirror element according to claim 16, wherein the diaphragm forming step of etching the thin base to form the diaphragm includes two stages of etching processes including a first

process of etching a half or more of the thickness of the thin base and a second process of etching the rest of the thickness part.

18. An optical pick-up which is a device for recording or reproducing data on an optical disk and has a unit for correcting a wave surface aberration of a laser beam, wherein at least one of the form variable mirror element according to any one of claims 1 to 13 or the form variable mirror unit according to claim 14 is mounted.

19. An optical pick-up according to claim 19, wherein at least one of the form variable mirror element according to any one of claims 1 to 13 or the form variable mirror unit according to claim 14 is used as the wave surface aberration correcting unit.